Pulmonary Microembolism by Platelet Aggregates as a Cause of Unexpected Sudden Death

SUDDEN DEATH in apparently healthy young adults may be associated with extensive accumulation of aggregated platelets within small arterial vessels of the lungs. In such cases the extent of vascular occlusion is sufficient to explain death on an embolic basis. Precise figures for the incidence of this condition are not yet available, but casual observations suggest that it is not rare. The histologic identification of platelet microemboli does not require special tissue fixation or staining but does require systematic attention to blood vessel contents and familiarity with the morphology of platelet aggregation. Although the cause of rapidly fatal pulmonary platelet microembolism in man is not known, it has been induced experimentally by a prostaglandin mediated mechanism.

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REFERENCES

Pirkle H, Carstens P: Pulmonary platelet aggregates associated with sudden death in man. Science 185:1062-1064, Sep 20, 1974

Pirkle H, Carstens P: Massive pulmonary microembolism by platelet aggregates—A newly recognized pathologic entity associated with unexpected sudden death. Am J Path 78:10a, Jan 1975

Silver MJ, Hoch W, Kocsis JJ, et al: Arachidonic acid causes sudden death in rabbits. Science 183:1085-1087, Mar 15, 1974

T and B Lymphocytes

IT HAS BEEN appreciated for some time that there are two major compartments of the immune system. One is involved in cell mediated defenses against fungi, viruses, foreign tissues and tumors, and the other with antibody production. Although the two systems, both composed of lymphocytes, are embryologically, anatomically and functionally distinct, there is cooperation between them. They in turn cooperate with a third cellular component, the macrophage.

The mediator cells in the cellular immune system are designated T lymphocytes because of the migration of precursor cells through the thymus where they are processed or "educated." Lymphocytes committed to antibody production via transformation to plasma cells are labeled B lymphocytes. In birds the latter designation refers to the migration of precursor cells through the bursa of Fabricius. In higher mammals, since there is no known anatomical counterpart, the B refers to bone marrow origin.

T lymphocytes typically reside in the paracortical areas of lymph nodes and the periarteriolar regions of the white pulp of the spleen. B lymphocytes are found in the follicles of the lymphoid tissues. However, neither type is restricted to these areas since lymphocytes are capable of migration and are found in blood, lymph and nonlymphoid tissues.

Although T and B lymphocytes cannot be distinguished from each other by standard microscopy, it is now possible to identify them by their different surface characteristics. B lymphocytes synthesize and retain antibodies on their surfaces. These function as receptors for antigens and can be detected as "surface immunoglobulins" using fluoresceinated or radioactively labeled antisera directed against the various immunoglobulin classes. Other surface receptors include those for the F_c component of the immunoglobulin molecule and for complement (C_3). The former is detected with labeled aggregated immunoglobulin or antigen-antibody complexes and the latter by demonstrating adherence of erythrocytes (E) coated with antierythrocyte antibody (A) and complement (C), that is, rosette formation (EAC). Although monocytes (macrophages) also possess F_c and C_3 receptors and thus may absorb immunoglobulins, they do not synthesize them.

T lymphocytes are currently identified by their poorly understood capacity to adhere to sheep erythrocytes and form spontaneous rosettes (E rosettes).

New methods for identifying T and B lymphocytes are rapidly appearing. Several laboratories have prepared antisera directed against human T and B lymphocyte surface antigens, but these have yet to be widely tested for specificity. With current techniques, 15 to 30 percent of human blood lymphocytes are B lymphocytes and 50 to 70 percent are T. Variable numbers of lymphocytes do not possess any of the identifying receptors detected by these methods and have been called "null cells."

The ability to categorize lymphocytes into these major classes has already added to our understanding of immune deficiency diseases and lymphoproliferative disorders. It is apparent that many lymphomas and lymphocytic leukemias can be characterized as T or B or null and that this approach to classification has value in determining prognosis and response to therapy. However, it is also apparent that the system is far more complex than this. Within these major categories